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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,653	06/27/2003	Adi Ofer	EMC-037PUS	2623

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DALY, CROWLEY & MOFFORD, LLP
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EXAMINER

KIM, HAROLD J

ART UNIT PAPER NUMBER

2182

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/607,653

Applicant(s)

OFER ET AL.

Examiner

Harold Kim

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14 and 16-19 is/are rejected.
- 7) ☒ Claim(s) 13 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-19 are presented for examination.
2. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

5. **Claims 1-12, 14, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Archibald, JR. et al., US Pub/ No. US 2002/0184580, in view of Thompson et al., US Patent no. 6,609,145.**

6. In re claims 1, 5-12, and 17, Archibald, JR. et al. shows a method of scheduling for use by a processor [paragraph 0023, line 6; 106 in fig 1] that controls storage devices [104 in fig 1; paragraph 0018, last 5 lines] of a data storage system [fig 1], comprising;

allocating processing time [paragraph 0023] between I/O operations [paragraph 0023, lines 3-4] and background operations [paragraph 0023, lines 2-7] based on an indicator of processor workload [paragraph 0023, lines 6-15].

Archibald, JR. et al. does show allocating processing time for background operations may be fixed, programmable, dynamically adjustable, or set according to any other rules or algorithm [paragraph 0023, lines 7-10]. However, Archibald, JR. et al. does not specifically show allocating processing time by using a lookup table having rows and each row comprises a plurality of elements corresponding to the predetermined time slots; the elements corresponding to I/O operations and background operations according to time percentages defining amounts of time allocated to tasks associated with such operations; the time percentages are user-configurable parameters; lookup table to select one of the I/O or background operations elements; the time percentages change with each row; the time percentage of the I/O operations elements increases as the busy levels increase; and the I/O operations elements and the background operations elements are distributed uniformly throughout a given row according to their respective time percentages.

Thompson et al. shows, as per claims 5-6, allocating processing time [fig 10] by using a lookup table [fig 10] having rows and each row comprises a plurality of elements corresponding to the predetermined time slots [pause duration and pause interval in fig 10];

as per claim 7, the elements corresponding to I/O operations and background operations [delay of command processing in fig 10] according to time percentages [0.1s

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in fig 10] defining amounts of time allocated to tasks [pause interval in fig 10] associated with such operations;

as per claims 8 and 17, the time percentages [0.1s in fig 10] are user-configurable parameters [user selectable in title];

as per claim 9,lookup table to select one of the I/O or background operations elements [fig 10];

as per claim 10, the time percentages change with each row [each row of table in fig 10];

as per claim 11, the time percentage of the I/O operations elements increases [0.1s to 1.6s in fig 10] as the levels increase];

as per claim 12, the I/O operations elements [not during the pause duration in fig 10] and the background operations elements [during the pause duration in fig 10] are distributed uniformly throughout a given row according to their respective time percentages [fig 10].

Therefore, one of ordinary skill in the art would have recognized that it would have been obvious to modify Archibald, JR. et al. system by including allocating processing time by using a lookup table having rows and each row comprises a plurality of elements corresponding to the predetermined time slots; the elements corresponding to I/O operations and background operations according to time percentages defining amounts of time allocated to tasks associated with such operations; the time percentages are user-configurable parameters; lookup table to select one of the I/O or background operations elements; the time percentages change with each row; the time

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percentage of the I/O operations elements increases as the busy levels increase; and the I/O operations elements and the background operations elements are distributed uniformly throughout a given row according to their respective time percentages since it would provide allocating processing time by using different rules or algorithm as Archibald, JR. et al. suggested [paragraph 0023, lines 7-9].

7. In re claim 2, Archibald, JR. et al. shows the indicator of processor workload comprises an indicator of I/O loading on the processor when used to control I/O operations of one or more of the storage devices [paragraph 0023, lines 3-4].

8. In re claim 3, Archibald, JR. et al. shows the indicator comprises a plurality of busy levels indicative of different levels of I/O loading on the processor [paragraph 0023, lines 10-15; paragraph 0015, lines 1-5].

9. In re claim 4, Archibald, JR. et al. shows allocating comprises determining the indicator by determining the busy level [paragraph 0023, lines 1-7]

10. In re claim 14, Archibald, JR. et al. shows the busy level is computed at periodic intervals [paragraph 0023, lines 7-9].

11. In re claim 16, Archibald, JR. et al. shows the background operations comprise pending non-I/O background tasks including data copy related activities [last 6 lines of Abstract].

12. In re claim 18, Archibald, JR. et al. shows all of the limitations in above claims including a stored computer program [paragraph 0019, lines 3-9] in memory [paragraph 0019, line 4].

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13. In re claim 19, Archibald, JR. et al. shows all of the limitations in above claims including a processor [106 in fig 1] for managing the plurality of physical resources [108, NVRAM; 104, storage; 109, scanner in fig 1].

Allowable Subject Matter

14. Claims 13 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Further references of interest are cited on Form PLO-892, which is attachment to this office action.

Any response to this action should be mailed to:

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Alexandria, VA 22313-1450

The centralized fax number is 703 872-9306.

The centralized hand carry paper drop off location is:

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2011 South Clark Place
Customer Window
Crystal Plaza Two, Lobby, Room 1B03

Any inquiry of a general nature or relating to the status of this application should be directed to the central telephone number (571) 272-2100.

Direct any inquiries concerning drawing review to the Drawing Review Branch (703) 305-8404.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harold Kim whose telephone number is 571-272-4148. The examiner can normally be reached on Monday-Thursday 6AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 571-272-4146. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

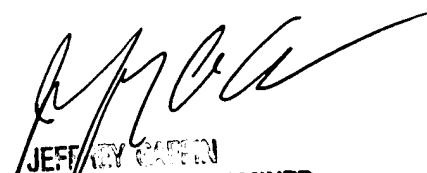
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Harold J. Kim

Patent Examiner

March 19, 2005/HK



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